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ABSTRACT

This is one of 21 reports dealing with the developmental history of recent and successful educational products. The report on the Frostig program is based upon: (1) published materials; (2) documents in the files of the developing agency; and (3) interviews with staff who were involved in the product development. All phases in the developmental process are elaborated: (1) product description, including characteristics, rationale, actual materials and product use; (2) origins; (3) funding; (4) product development, including management, organization, original plans and modifications, and actual procedures; (5) diffusion; (6) adoption of the product; and (7) a projection of the products' future. A list of references concludes the report. (TL)

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PRODUCT DEVELOPMENT REPORT NO. 7

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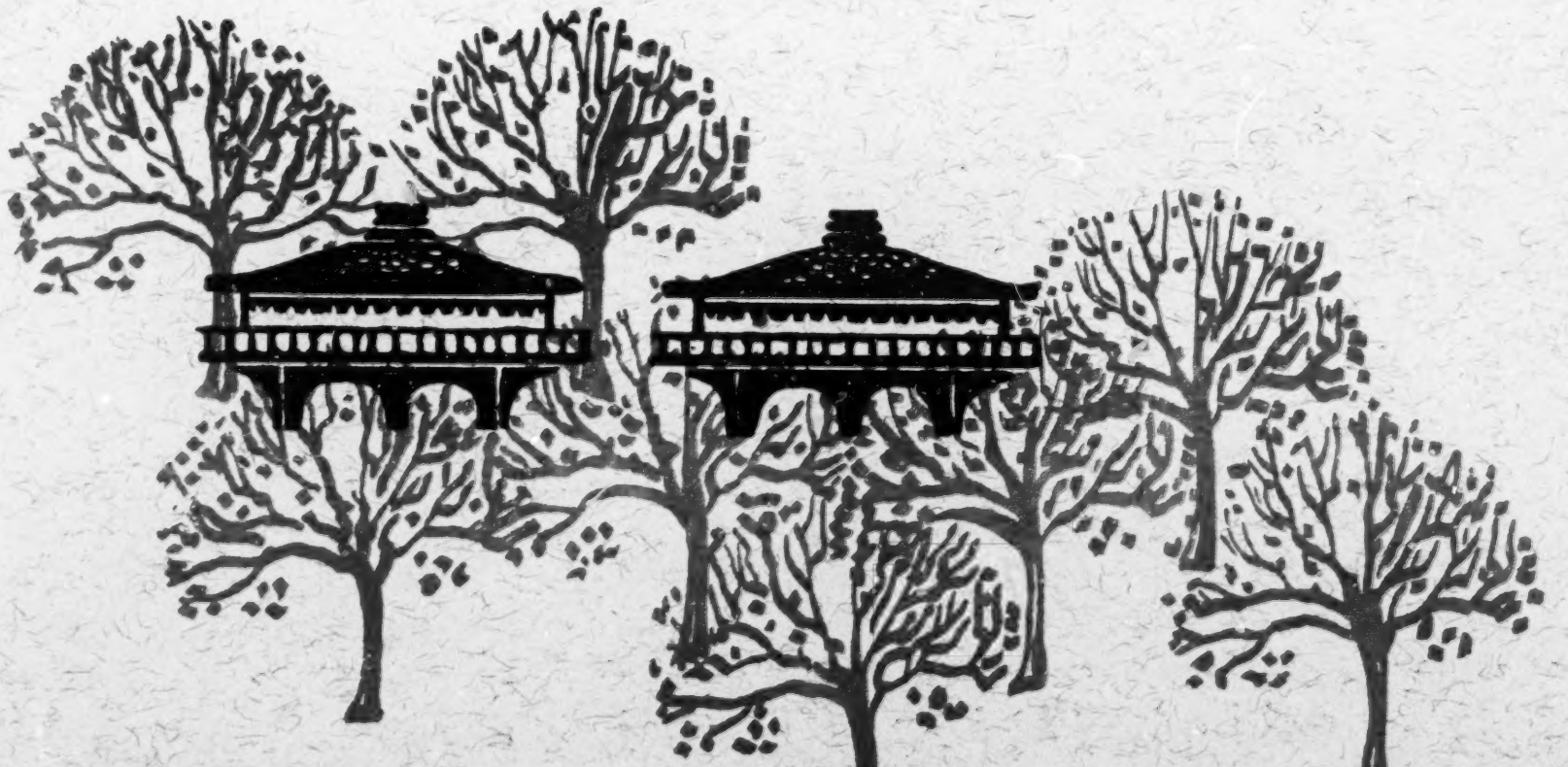
THE FROSTIG PROGRAM FOR PERCEPTUAL-MOTOR DEVELOPMENT

DEVELOPED BY THE MARIANNE FROSTIG CENTER OF EDUCATIONAL THERAPY

December, 1971

Contract No. OEC-0-70-4892



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Daniel W. Kratochvil

American Institutes for Research
in the Behavioral Sciences

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The research reported herein was performed pursuant to a contract with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
Office of Program Planning and Evaluation

PREFACE

This product development report is one of 21 such reports, each dealing with the developmental history of a recent educational product. A list of the 21 products, and the agencies responsible for their development, is contained in Appendix B to this report. The study, of which this report is a component, was supported by U.S. Office of Education Contract No. OEC-0-70-4892, entitled "The Evaluation of the Impact of Educational Research and Development Products." The overall project was designed to examine the process of development of "successful educational products."

This report represents a relatively unique attempt to document what occurred in the development of a recent educational product that appears to have potential impact. The report is based upon published materials, documents in the files of the developing agency, and interviews with staff who were involved in the development of the product. A draft of each study was reviewed by the developer's staff. Generally, their suggestions for revisions were incorporated into the text; however, complete responsibility for interpretations concerning any facet of development, evaluation, and diffusion rests with the authors of this report.

Although awareness of the full impact of the study requires reading both the individual product development reports and the separate final report, each study may be read individually. For a quick overview of essential events in the product history, the reader is referred to those sections of the report containing the flow chart and the critical decision record.

The final report contains: a complete discussion of the procedures and the selection criteria used to identify exemplary educational products; generalizations drawn from the 21 product development case studies; a comparison of these generalizations with hypotheses currently existing in the literature regarding the processes of innovation and change; and the identification of some proposed data sources through which the U.S. Office of Education could monitor the impact of developing products. The final report also includes a detailed outline of the search procedures and the information sought for each case report.

Permanent project staff consisted of Calvin E. Wright, Principal Investigator; Jack J. Crawford, Project Director; Daniel W. Kratochvil, Research Scientist; and Carolyn A. Morrow, Administrative Assistant. In addition, other staff who assisted in the preparation of individual product reports are identified on the appropriate title pages. The Project Monitor was Dr. Alice Y. Scates of the USOE Office of Program Planning and Evaluation.

Sincere gratitude is extended to those overburdened staff members of the 21 product development studies who courteously and freely gave their time so that we might present a detailed and relatively accurate picture of the events in the development of some exemplary educational research and development products. If we have chronicled a just and moderately complete account of the birth of these products and the hard work that spawned them, credit lies with those staff members of each product development team who ransacked memory and files to recreate history.

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PRODUCT DESCRIPTION

Product Characteristics

Name

The Frostig Program for Perceptual-Motor Development

Developer

The Marianne Frostig Center of Educational Therapy, Los Angeles, California.

Distributor

The Frostig Program is distributed by both Follett Educational Corporation in Chicago and Consulting Psychologists Press in Palo Alto, California.

Focus

The Frostig Program is specifically aimed at enhancing perceptual-motor abilities at their maximum period of development. These abilities, considered essential to school learning and healthy emotional growth, are grouped under the following developmental functions: sensory-motor, language, perception, higher cognitive processes, social adjustment, and emotional development.

Grade Level

Kindergarten through grade 3.

Target Population

The target population of the Frostig Program consists of the typical student, as well as students with developmental deficiencies. Included in the latter group are the educationally handicapped--students with specific learning disabilities, those culturally deprived, those physically or emotionally handicapped, and those mentally retarded.

Rationale for Product

Long Range Goals of Product

The long range goal of the product is the integration of sensory-motor, language, and perceptual skills with the learning of school subjects to enhance total development, including the emotional and social aspects.

This product, which includes both testing and training materials, was followed up by another program, called Move-Grow-Learn, also published by Follett Educational Corporation. This program, based on Frostig's book,

Movement Education: Theory and Practice, focuses more on movement than on visual perception; Move-Grow-Learn will be discussed under the Future of the Product. This report will deal with Frostig's visual perception test and her program for the development of visual perception. Contrary to the titles of the test and training materials, the product emphasizes the total development of the student; this will be explained below.

Objectives of Product

The Frostig approach is based on the definition of six areas of "developmental functions" (Frostig & Maslow, 1968), four of which are considered to unfold at fairly predictable ages in a definite sequence. These functions and their periods of maximum development are:

Function	Description	Period of Maximum Development
Sensory-Motor	Child explores environment simultaneously through movement and sense modalities; becomes aware of himself as separate from the world and learns to manipulate objects.	Birth to Age 2
Language	Child learns to understand and express ideas through speech and uses language to facilitate thought processes.	Ages 1-1½ to 3-4
Perception	Child discriminates and recognizes stimuli in environment without resorting to manipulation. Immediate perceptions determine thought processes.	Ages 3½-4 to 7-7½
Higher Cognitive Processes	Child develops beyong reliance on immediately perceived stimuli. Develops cognitive abilities such as reversibility, conservation, seriation, probability, inference, and checking hypotheses.	Ages 6½-7½ on

The other two developmental functions, social adjustment and emotional development, have no one single period of maximum growth, but are interrelated with all the other functions at all stages.

All of these developmental functions are considered to be interrelated in behavior and are subject to varying degrees of disturbance, whether manifested

as temporary developmental lags or more permanent deficits. Therefore, the overall objective of the Frostig Program, as indicated under Long Range Goals of the Product, is the integration of sensory-motor, language, and perceptual skills with the learning of school subjects to enhance total development, including its emotional and social aspects. In line with this objective, it is designed to be used in three ways:

- As a preventive developmental readiness program for all normal children.
- As a corrective program to train or reinforce lagging skills.
- As a remedial program for children with specific disabilities.

According to the developer, it should be stressed that these broad objectives do not imply that the Frostig Program is meant to introduce universally applicable techniques for the diagnosis of treatment of children in specific diagnostic categories (e.g., neurologically handicapped). Rather, it is to provide one basis to evaluate the needs of the individual child and build an appropriate individual training program from a wide range of techniques. For example, based on the six defined developmental abilities, a child with perceptual and language disturbances needs a different educational treatment than a highly verbal child with perceptual and emotional problems.

Philosophy and Theories Supporting Product

The philosophical assumptions behind the program are holistic, organismic, developmental, functional--i.e., the understanding of behavior depends upon its role in the overall functioning of the organism in relation to the inner and outer environment in an ongoing pattern of development. The approach is described as "cognitive-developmental" rather than "behavioral," and the program was developed on the basis of clinical experience.

The originator, Dr. Frostig, identifies herself as being in the tradition of the early pioneers Seguin, Itard, Froebel, and Maria Montessori, who emphasized both the importance of intuitive clinical observation and the coordination of several sense modalities in the education of young children (Frostig, 1967). Although the materials focus on perceptual-motor skills, the self-correcting methods and classroom management techniques introduced by Montessori were influential in the development of the Frostig Program, which gives the teacher a wide variety of very specific suggestions aimed at enhancing the optimum cognitive and emotional growth of each child.

The Gestalt School was also an important influence, according to the developer, as was the developmental point of view exemplified by Jean Piaget, Heinz Werner, and Erik Erikson, as well as Luria in Russia and Charlotte and Karl Buhler in Germany.

Basic to the Frostig orientation is the conviction of the primacy of perception in its widest sense: perception is experience in that it is the process occurring in the brain (not within the sense receptors) which extracts, discriminates, and interprets information coming from environmental stimuli. Perception is therefore crucial for total personal development and adjustment (Frostig & Orpet, 1969). The most specific implications of the researches of Piaget and Werner for the Frostig approach were: Piaget's findings on the rapid and concentrated development of perceptual processes from the ages of about 3 to 7 and their importance for later cognitive development; and Werner's emphasis on the hierarchical nature of development and the importance of the role of movement for the structuring, timing, and mode of presentation of perceptual training exercises (Frostig, Lefever, & Whittlesey, 1961). Werner's "sensory-tonic" theory of perception holds that perception reflects a tending toward equilibrium of an intimate relationship between an outside stimulus and the ongoing organismic state, and that sensory and motor functions are "equivalent." That is, as evidenced in experiments analyzing perception by introducing asymmetries in neuromuscular states, either a sensory or a muscular stimulus produces an equivalent perceptual result. Furthermore, perceptual changes reflecting tendencies toward equilibrium can be linked in predictable ways to both individual differences and developmental principles (Werner, 1957).

The attempt to identify and relate functional attributes to developmental sequences is fundamental to the entire approach on which the product is based. This complementary developmental and functional line of investigation taken in the development of the Frostig Program was also based in Frostig's clinical experience. She felt that, first, a way to understand a particular child is to inquire into his developmental history and compare his abilities with those of his age mates; and, second, it is essential to measure his individual level of functioning in perceptual and other psychological abilities as specifically as possible. The Frostig test arose out of the need seen by the developer for a test keyed to age norms which would differentially screen perceptual abilities at an early age. The training materials grew out of remedial clinical practice

based on coordinating functional abilities in accordance with a developmental sequence.

A primary motivation behind both the test and the training materials was the developer's felt need for methods applicable to a non-clinical setting, which would help to prevent difficulties from arising by pinpointing possible areas of difficulty and instituting remedial procedures early enough in the developmental sequence. Therefore, the materials are aimed at educating the awareness of the classroom teacher to possible developmental disturbances and making accessible measurement techniques and training methods for developing the perceptual readiness considered crucial to the early learning process.

Description of Materials

Organization, Format, and Content of Materials

For the purposes of this report, the components of the Frostig Program for Perceptual-Motor Development include:

1. The Frostig Developmental Test of Visual Perception
2. The Frostig Program for the Development of Visual Perception
    a. Pictures and Patterns developmental readiness program in workbook format sequenced by level of difficulty.
    b. Frostig Program Box, a remediation program in separate worksheet format geared to the visual perceptual areas evaluated by the test.

As noted above, the Frostig Move-Grow-Learn Program for movement education will be briefly described in a later section.

The Frostig Development Test of Visual Perception. Available materials related to this test include: a test specimen set, a test booklet, a test administration and scoring manual, test scoring keys, test demonstration cards, and a test monograph.

The test may be given either individually (approximately 30-45 minutes) or in groups (approximately 40-60 minutes) and should be given by trained test personnel (i.e., psychologists, testing or reading specialists, or teachers trained in the administration of individual tests). It is designed for children aged 3 to 8 to pinpoint strengths and weaknesses relative to age norms in

five operationally defined perceptual functions: (1) visual-motor coordination; (2) figure-ground perception; (3) perceptual (form) constancy, (4) perception of position in space; (5) spatial relationships. Results of measurement of these functions gives five subtest scores, which may be converted into perceptual age equivalents based on the performance of the average child in various age groups. Or, the scores may be converted into scale scores, and the sum of the scale scores into a "perceptual quotient" (PQ). The visual perceptual age indicates the child's developmental level in comparison to norms of his chronological age mates. Differences among subtest scores may also reveal special areas of perceptual difficulty, and the main function of the test is to define such areas as a basis for instituting special training.

See Table 1 for examples of test items and functions covered.

The Frostig Program for the Development of Visual Perception. This program is available in two formats with essentially similar content. They are: the remediation program and Pictures and Patterns. Materials in the remediation program include: the Frostig Program Box of 359 worksheets with remedial exercises, separate worksheet sets for each area, pupil record sheets, and teacher's guides. Materials available for the Pictures and Patterns workbook series include: a student book and a teacher's guide for beginning, intermediate and advanced levels; transparent acetate overlays, and a programmed teacher training manual.

The remediation program, in worksheet format, is geared to the five visual perceptual areas of the Frostig Test and designed for use with children having specific difficulties in these areas. (See the last column, "Training Procedures," in Table 1 below for the kinds of activities recommended for each area identified by the test.) However, since the worksheets were designed purposefully to integrate skills within and among areas, they are very much broader in scope than the corresponding test areas would suggest. For example, the test measures only form constancy, while the corresponding worksheets include size constancy also; the test does not measure visual sequencing ability, but the worksheets train for this. Furthermore, a single worksheet often includes training in more than one area--although labeled an exercise for "figure-ground," it may include spatial relationship and form constancy elements.

The Teacher's Guide in the remediation program gives directions for use of the worksheets, in order of difficulty within each area. It includes

Table 1

Frostig Developmental Test of Visual Perception
(Brief Summary)

Subtest	Example	Functions Covered	Training Procedures
Eye-Motor Coordination	Draw straight lines horizontally. Stop and start on target.	Eye-hand coordination necessary for handwriting, drawing, arts and crafts, manipulatory and self-help activities.	Eye movement training Arts and crafts Manipulatory exercises Handwriting exercises Physical education program Frostig worksheets
Figure-Ground	Find a hidden figure. Find one of two or several intersecting figures.	Ability to focus visually on relevant aspects of visual field and "tune out" irrelevant background	"Finding" games Sorting exercises Frostig worksheets
Form Constancy	Find all the squares on a page regardless of color, background, tilt, size.	Ability to see sameness of essential form despite image on retina. Has implication for learning to identify letters presented in various prints.	Identify objects or drawings at different distances or angles. Draw diagrams of 3-dimensional patterns. Find all objects of a certain shape in the room. Frostig worksheets
Position in Space	Find the form which is reversed or rotated.	Ability to discriminate position; to differentiate letters such as d and b, w and m.	Exercises promoting awareness of body position to objects--go under the table, over chair, around the desk, etc. Physical education program. Learning directions in space: right, left. Frostig worksheets.
Spatial Relations	Duplicate a dot pattern by linking dots with a line.	Ability to see spatial relationships of objects to one another related to ability to perceive the sequence of letters in a word.	Copy patterns with pegs, beads, marbles, puzzles, description of spatial relationships of one object to another; Frostig worksheets; spelling and writing.

additional physical exercises and 3-dimensional activities at each level, which are described as essential for proper use of the 2-dimensional paper and crayon exercises on the worksheets. The physical exercises develop such things as gross and fine motor coordination, directionality, and eye movement. The 3-dimensional activities suggested involve the use of manipulation materials such as blocks, beads, geometric forms, toys, etc., to help develop sensory-motor functions, concepts, and other skills for academic learning. The arrangement by level of difficulty within each area and the spirit master format are intended to facilitate the tailoring of remedial work to the individual child. One child who needs form constancy training may have to repeat some of the worksheets several times; while another child with the same need may work through each at a rapid rate, or may be placed at a higher level in the sequence.

The workbooks in Pictures and Patterns contain essentially the same paper and crayon exercises as the worksheets, but arranged to sequentially develop visual perceptual skills in the normal classroom. Each level of difficulty combines exercises for all five perceptual areas and identifies each area. The pages are perforated so that children can remove them to work on or to take home, and acetate overlays are used to enable children to do the same exercise as many times as necessary.

The Teacher's Guides in Pictures and Patterns give physical and 3-dimensional activities similar to those in the remediation program, but the integration of visual perception with other psychological functions and with academics is much more defined (e.g., language, auditory perception, concept formation, sequential memory). The intent is that each exercise be used in whatever way teacher judgment dictates for each child. The same worksheet exercise can be used to emphasize oral expression for one child, vocabulary development for another, and so on.

Cost of Materials to User

The following are the costs of the two major components of the Frostig Perceptual-Motor Program:

1. Frostig Developmental Test of Visual Perception

Materials	School Prices (Follett)
Test specimen set	$ 5.01
Test booklets	$.60 each, with discounts for quantity orders.
Test administration and examiner's kit	$10.50 (10 tests, scoring keys, demonstration cards, monograph and manual)
Administration and scoring manual	$ 3.00
Test scoring keys	$ .51 (3)
Test demonstration cards	$ 1.50 (11)
Test monograph (1963 standardization)	$ 3.00

2. The Frostig Program for the Development of Visual Perception

a. Remediation Program	School Prices (Follett)
Frostig Program Box (includes 359 worksheets with remedial exercises for all 5 visual perception areas, plus one Teacher's Guide.)	$98.62
Separate spirit master worksheet sets in each area:	
Visual-Motor Coordination (90 masters)	32.19
Figure-Ground (78 masters)	29.19
Perceptual Constancy (70 masters)	26.19
Position in Space (36 masters)	13.59
Spatial Relationships (85 masters)	32.19
Individual Pupil Record Sheets (pkg. of 25)	1.59
Single replacement masters	1.02
Teacher's Guide (separate)	3.54
Individual set of 359 printed exercises for use with one pupil:	9.93
or 20-set carton of same printed exercises:	80.88

b. Pictures and Patterns Workbook Series

Beginning Pictures and Patterns

Student Book	.81
Teacher's Guide	1.65

	School Prices (Follett)
Intermediate Pictures and Patterns	
Student Book	$ .90
Teacher's Guide	1.65
Advanced Pictures and Patterns	
Student Book	.99
Teacher's Guide	1.65
Transparent Acetate Overlays (for use with all books to permit repeated practice):	
Set of 15	3.57
Set of 100	18.66
Set of 500	79.80
Pictures and Patterns Programmed Teacher Training	3.96

Procedures for Using Product

Learner and Teacher Activities

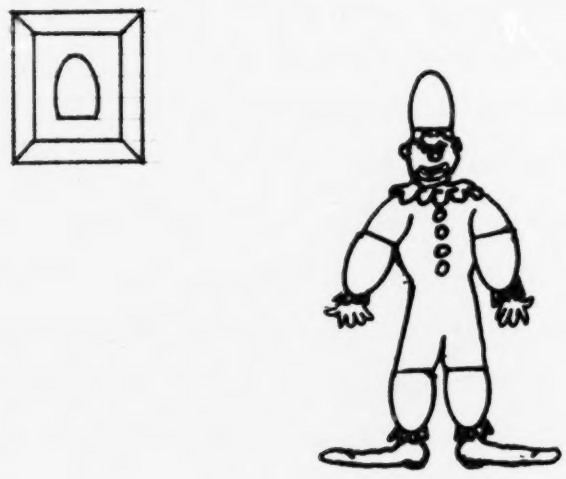
The following discussion of the use of the Frostig training program includes a description of the typical learner and teacher activities. This illustration was taken from a film available from the Frostig Center for sale or rental entitled "Visual Perception Training in the Regular Classroom." The film opens with a kindergarten teacher explaining that the use of the program not only helps to insure that most children are ready for first grade but also reveals individual disabilities soon enough for appropriate extra help to be given. When they get to first grade, their first grade teacher knows their perceptual strengths and weaknesses before starting reading instruction. The following are two of many examples in the film, one from a kindergarten and one from a first grade classroom. (Children are usually divided into groups for the perceptual training because of the importance of close teacher interaction and immediate checking of performance.)

1. Kindergarten activity related to "figure-ground" perception. The object is to help children to develop ability to read words in proper sequence and to avoid confusing relevant words and letters with surrounding ones. The teacher tells a story and leads discussion about circuses. As part of it, she holds up a card with the written word "CLOWN" and gets the group to repeat the letters, helping them to associate letter shapes and names. An identical card is placed elsewhere in the room and the children are asked to locate it (a

combined perceptual-motor task). Then they do a clown workbook exercise (see Figure 1 below).

Figure 1

Kindergarten Exercise

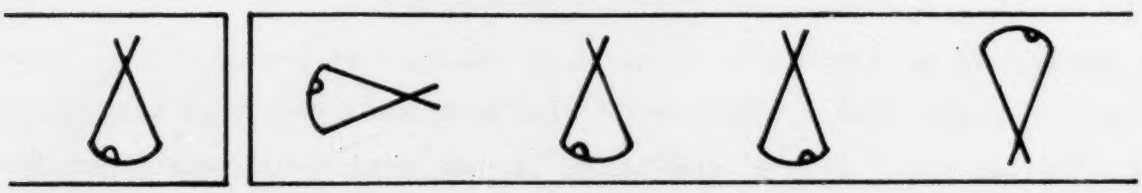


They are told to look at the picture of a clown in the workbook. In the box at the top of the page is a shape matching many parts of the clown's body. They are asked to move paper cutouts of that shape around the clown outline until they find all the shapes that are like it. Or they could be asked to outline the shapes with crayon instead of using cutouts. Finally, they are asked to try to write the word "CLOWN."

2. First grade activity related to perception of position in space and spatial relationships. Students do "body awareness" activities according to the teacher's directions--they open and shut hands, move in circles, push against each other, copy "follow the leader" movements of others. Then they do a workbook exercise on Indian teepees designed to teach similarities and differences (see Figure 2).

Figure 2

First Grade Exercise



Stringing beads of different shapes and sizes teaches sequencing as part of learning spatial relationships. Then children can move around each other to

learn the words denoting spatial relationships (between, in front of, behind). A frequent problem said to derive from difficulties in perceiving position in space, for example, is the perceiving of b as d or on as no in learning to read.

The developers have advocated "restricted" distribution of the test according to APA guidelines; that is, test purchases are confined to physicians, paramedical personnel, psychologists, and school administrators. Teachers may order the test if approved by the district psychologist. The Frostig Center does give courses in administration, scoring, and interpretation of the Frostig Test. Such courses, conducted by psychologists, are open to teachers approved by their school districts. The developers make every effort to impress upon those teachers taking the course that their testing and interpretation should remain under the general supervision of their school psychologist. However, the chief thrust of their short courses and workshops is on ability training, not testing.

Provisions for Parent/Community Involvement

No special provisions for parent/community involvement were made in the program.

Special Physical Facilities or Equipment

No special physical facilities are required for utilizing the program.

Recommended Assessment Techniques for Users

The recommended assessment technique for users is the Frostig Developmental Test of Visual Perception, already discussed under Product Description.

ORIGINS

Key Personnel

Dr. Marianne Frostig's commitment to the investigation of sensory-motor and perceptual disabilities and their implications for remedial training began at age 18. In training as a child social worker at the University of Vienna pediatric clinic, she rebelled at the way the behavior of encephalitic children was dismissed as incurably delinquent because of brain damage. She began to search for techniques to help such children whom she felt were trying to behave but could not. There, and later in her work in an Adlerian children's home and in an adult work rehabilitation program, she observed the sensory-motor

and perceptual disturbances common to a wide variety of diagnosed problems. During this early period she was also working as a rhythm teacher, having been trained in the methods of Dalcroze and Laban--similar to gymnastics but less structured and with more emphasis on free movement. In her work with handicapped children and adults, she instituted these movement education techniques, as well as methods and materials based on the work of Maria Montessori. From these early training efforts in the areas of gross motor and fine perceptual skills, she observed positive effects on behavior, self awareness, and cognitive and emotional development. Through her psychiatrist husband, Dr. Frostig was introduced to the work of Heinz Werner and the Gestalt School, both of which were influential in the development of her approach to educational psychology.

Coming to this country just before World War II, she acquired American education credentials, first earning a B.A. degree in Child Welfare at the New School of Social Research in New York. After settling in Los Angeles in 1947, she earned her M.A. in Psychology at Claremont College, and a Ph.D. in educational psychology at the University of Southern California in 1955. Her dissertation concerned the use of projective methods with elementary school children. During this time, she taught at both the 4th grade and junior high school levels and was a part-time psychologist at Los Angeles Juvenile Hall from 1949 to 1955.

Dr. Frostig, often described as a pioneer in special education, is the founder and presently Executive Director of the Marianne Frostig Center of Educational Therapy in Los Angeles. She is Professor of Special Education at Mount St. Mary's College and Clinical Professor of Education at the University of Southern California. She is a licensed clinical and school psychologist and holds both a California General Elementary Teachers Credential and a California Secondary Credential for Teaching of Mentally Retarded.

In addition to contributing numerous publications in her field, she has received many special honors, among them both the Golden Key Award and Learning Disabilities Award from the Association for Children with Learning Disabilities (1966 and 1968) and an award for distinguished contributions to the field of learning disabilities from the Advanced Institute of Leadership Personnel in Learning Disabilities (1969). In 1970 Dr. Frostig was chosen as a Woman of the Year by the Los Angeles Times.

Mrs. Phyllis Maslow was Coordinator of Research at the Marianne Frostig Center during most of the main period of product development (1961-1969). She has an undergraduate degree in Liberal Arts and an M.A. in International Relations from the University of Chicago; she has currently completed all but final thesis requirements for a Ph.D. in Educational Psychology from the University of Southern California. Her interest in Special Education developed from her personal and later professional association with Dr. Frostig.

During the program development she coordinated the collection and recording of data, both from the Center and from public school districts, as well as serving in an overall administrative and advisory capacity. She worked closely with the chief research design consultant, Dr. D. W. Lefever and the head data processing analyst, John Whittlesey. With the latter two colleagues and Dr. Frostig, she co-authored the 1963 test standardization monograph on the Frostig Developmental Test of Visual Perception, and she co-authored with Dr. Frostig several professional papers related to visual perception, school adjustment, language training, and educational therapy. Other professional activities have included panel memberships and papers presented on perceptual-motor dysfunctions, visual perception in deaf children, and assessment and training of perceptual abilities.

Mrs. Maslow collaborated closely with Dr. Frostig on the MGL (Move-Grow-Learn) movement education program published in 1969, including the textbook, Movement Education: Theory and Practice. She is currently working with Dr. Frostig on a new textbook designed to present the total Frostig program approach to the classroom teacher.

Dr. D. Welty Lefever was the chief research consultant in the development and standardization of the Frostig Test, intimately involved in the experimental design and statistical analysis. Emeritus Professor of Education at the University of Southern California, Dr. Lefever's wide experience in the fields of educational testing and measurement, as well as guidance and counseling, has included work on the predictive value of the Thorndike Intelligence Test, three monographs with Charlotte and Karl Huhler on the standardization of the Rorschach Test, publication of the SRA Achievement Series (nationally standardized achievement test batteries), and a book on Principles and Techniques of Guidance. He has been a contributor to the various editions of Buros' Mental Measurements Yearbook and the Dictionary

of Education, and has been Associate Editor of the Journal of Educational Research, Journal of Experimental Education, and the California Journal of Educational Research.

John R. B. Whittlesey was the chief data processing analyst in the development of the Frostig Test and was co-author with Frostig, Maslow, and Lefever of the 1963 test standardization monograph. Mr. Whittlesey received a B.S. in physics and an M.S. in astronomy from the California Institute of Technology and did graduate work at the University of North Carolina in mathematical statistics. There, he received training in computer programming and data processing. At the time of the development of the Frostig Program he was working in the field of behavioral science statistics and data processing at the UCLA Medical Center, with major interests in experimental design, perception, and psychopharmacology.

David Horne, who has been for many years a child therapist at the Marianne Frostig Center, collaborated with Dr. Frostig in a research program on autistic children conducted at the Center in the early 1950's. Out of this work he produced a film, "The World Outside," a documentary report on the treatment methods which has won two awards and is widely used as a teaching device at universities and clinics. The combination of his experience in child therapy and perceptual research with his writing talents led to his being the chief editorial collaborator in the development of the training materials in the Frostig Program for the Development of Visual Perception. He is co-author with Dr. Frostig of both versions of this program, being particularly responsible for writing the directions in the Teacher's Guides.

In addition to the film mentioned above, he produced two films out of the Frostig program development: "Visual Perception and Failure to Learn," which demonstrates the relationship between various types of visual perceptual disability and learning difficulties; and "Visual Perception in the Regular Classroom," describing methods for using visual perception training in the regular classroom with maximum effectiveness. He has just completed a film on reading difficulties. These films have been instrumental in the diffusion of the Frostig Program.

Sources and Evolution of Ideas for Product

The Frostig Program is uniquely an evolution of the ideas and experience of Dr. Marianne Frostig in her work with children with learning disabilities.

Dr. Frostig describes the work which led directly to the formulation of her idea for the perceptual testing and training program as beginning in the late 1940's "at her kitchen table," working with individual children with learning disabilities. For approximately the next 10 years she worked with larger and larger numbers of these children, building what became the present Marianne Frostig Center of Educational Therapy. During this time, she first rented a a small house where she could take up to 10 children; she next joined forces with another special education worker, Mrs. Belle Dubnoff, in whose house they were eventually treating up to 40 children. In the middle 1950's, Dr. Frostig moved on her own to another house which became the Frostig Center of that time. The developers noted that all of this work was supported entirely by tuition fees and donations of time and some money.

In her clinical work over these years with children with a wide range of learning and behavioral disturbances, she was experimenting with various perceptual-motor training methods and attempting to define the perceptual abilities which seemed most relevant to school learning. Many of the children had been diagnosed as having minimal brain damage, but whatever the diagnostic category, visual or auditory perceptual disturbances were concluded to be most prevalent; disturbances were by far the most frequent in contributing to learning difficulties.

Relevant Research

Dr. Frostig's theoretical orientation during this time was a complementary functional and developmental approach to problems of perception, with strong personal emphasis on early identification of perceptual dysfunctions before their manifestation in severe learning or emotional difficulties (Frostig & Orpet 1969). The following research was relevant to her thinking at this time.

Neurophysiological theories. Hebb's neurophysiological theory included the assertion that perception is a learned or partly learned process; he also stressed the importance of eye movements in perceptual learning. This had practical implications for the belief that perception could be trained and for the direction some training procedures might take. Other neurophysiological theories (e.g., Heider, Attneave, Broadbent), concerned with attention, and selection and sorting of stimuli, fitted in with Dr. Frostig's observations that children with learning difficulties almost invariably manifested general disorganization in terms of focusing attention, self-control, selection of stimuli, and memory sequencing.

Theories based on pathology. Pioneers in the field of multisensory methods in adapting curriculum to brain-damaged children, such as Strauss and Lehtinen, followed by Cruickshank, stressed the treatment of perceptual difficulties as related to disturbed self-concept in behavior disturbances. Equally important was the work of Cruickshank and Wedell with cerebral palsied children, and other studies which suggested that a number of independent perceptual abilities are involved in the solution of most perceptual tasks. Cruickshank concluded that particular perceptual functions were disturbed to varying degrees and that the idea of general perceptual impairment was not borne out by his data. This work supported the Frostig clinical observations that in many children particular areas of perception were independently disturbed.

Psychological research. Gesell's studies of visual development and eye-hand coordination supported the Frostig emphasis on the interrelationship of movement and perception and the importance of the role of experience and learning in perception. The theories of both Eysenck in England and Witkin in this country are concerned with individual differences in perceptual modes and the ordering of these modes on a continuum. In particular, Witkin's formulations of the role of life experiences in individual styles of perception gave support to the notion that perceptual distrubances can be alleviated by influencing life experiences.

Trends of the Time

Several significant trends were also relevant to the development of the Frostig Program. "Minimal brain dysfunctions" in children had been receiving increasing attention during the 1950's and '60's from educators, linguists, psychologists and physicians. Generally, the term is applied to a child of normal intelligence who manifests mild to severe learning or behavior disabilities associated with such things as perceptual impairment or distrubances in conceptualization, language, memory, or motor functions.

The development of the Frostig program coincided with a spurt in interest and support for the development of Special Education programs for the "educationally handicapped." During the late 1950's and early '60's there was growing public realization of the need for more attention to the perhaps 10-15% of children with learning disabilities which could not be diagnosed according to any specific etiology. Such children, of normal intelligence, were unable to function in public schools because of language or cognitive

disturbances and/or emotional and behavioral difficulties. There was a growing demand for special classes for these children but a corresponding lack of knowledge, trained teachers, or materials to help them. Similarly, special classes for the neurologically handicapped were starting to be established in public school districts in many states; questions of how to identify children to be placed in these classes and how remedial training might be conducted were becoming increasingly urgent.

The early 1960's saw the rapid development of interest in early childhood education in general, and a growing awareness of the needs of the culturally deprived and political commitment to their compensatory education. The increasing availability of Federal funds for research in this area, culminating in the Head Start program in 1965, exemplifies the climate of opinion. However, these trends had less to do with the development of the Frostig program than with its startingly fast diffusion and will be discussed later in this report.

Technological Prerequisites

In terms of time and the small staff and available resources, Dr. Frostig has stated that she would not have considered starting on the test construction without access to computer facilities. Although, compared to original plans, the extent of item analysis, the size of the test standardization sample, and validity and reliability measures were all curtailed for lack of funds, the test could not have been developed without existing computer technology for data analysis.

Similar Products

The Frostig materials were the first commercially available materials for the developmental training of visual perception. There were several perceptual tests on the market prior to the Frostig test, either as part of general intelligence tests, or as diagnostic instruments for identifying organic dysfunctions. As will be described later, none of them met the need seen by the developer for a group test keyed to age norms which would differentially screen perceptual abilities at an early enough age. None was designed for use by teachers in a school situation.

First Formulation of Idea for Product

The various components which now make up the Frostig program all evolved from the work with children at the Frostig Center in the decade 1950-60 and even earlier. See Figure 3, beginning on the next page, for a chronological

listing of the major events in the history of the products. Many of the individual sensory-motor and perceptual training exercises which were later incorporated into both the developmental visual perception program and the movement education program were prepared throughout this period in response to clinical needs. By 1958 Dr. Frostig's clinical experience, research, and the philosophical and theoretical evolution of her ideas had culminated in a strongly felt need for an adequate test instrument in the field of visual perception that would make it possible to specify remedial exercises more exactly. "I felt strongly something should be done."

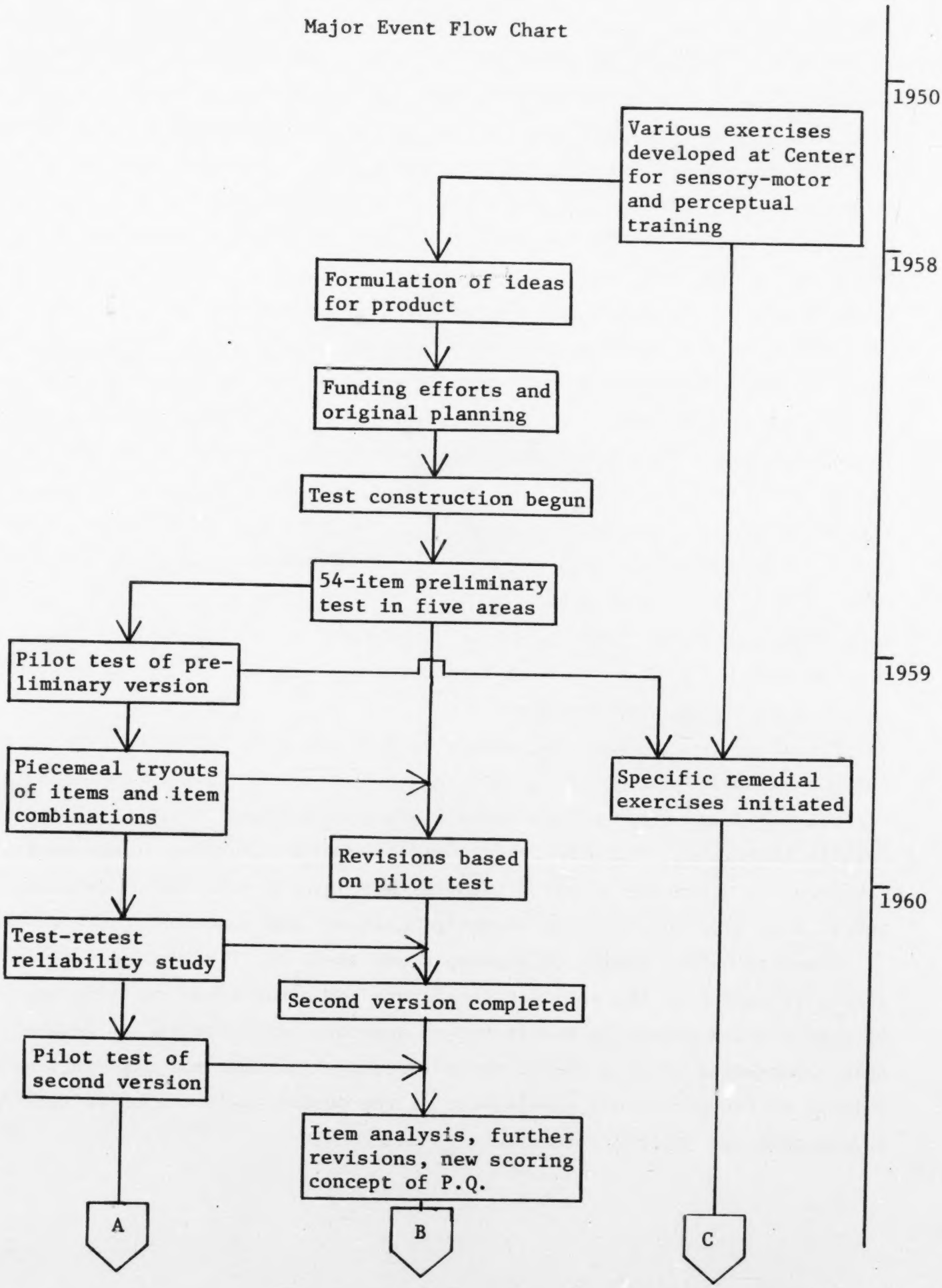
What became the Frostig Developmental Test of Visual Perception was designed to be a "narrow-gauge" test; that is, as opposed to "broad-gauge" tests which yield complex information covering a wide range of functions, the Frostig test attempts to provide exact information in one narrow functional area. This focus was directly related to two major considerations: (1) Among various perceptual disturbances, there was a very high incidence of visual perceptual disturbances in learning failure; (2) the primary motivation was to develop specific data on which to base remedial strategies in individual cases. Dr. Frostig also describes her strong feeling at this time "against developing yet another test to pin a diagnostic label on a child." She therefore defines the test as neither diagnostic nor predictive, but as evaluative in terms of recommended remediation.

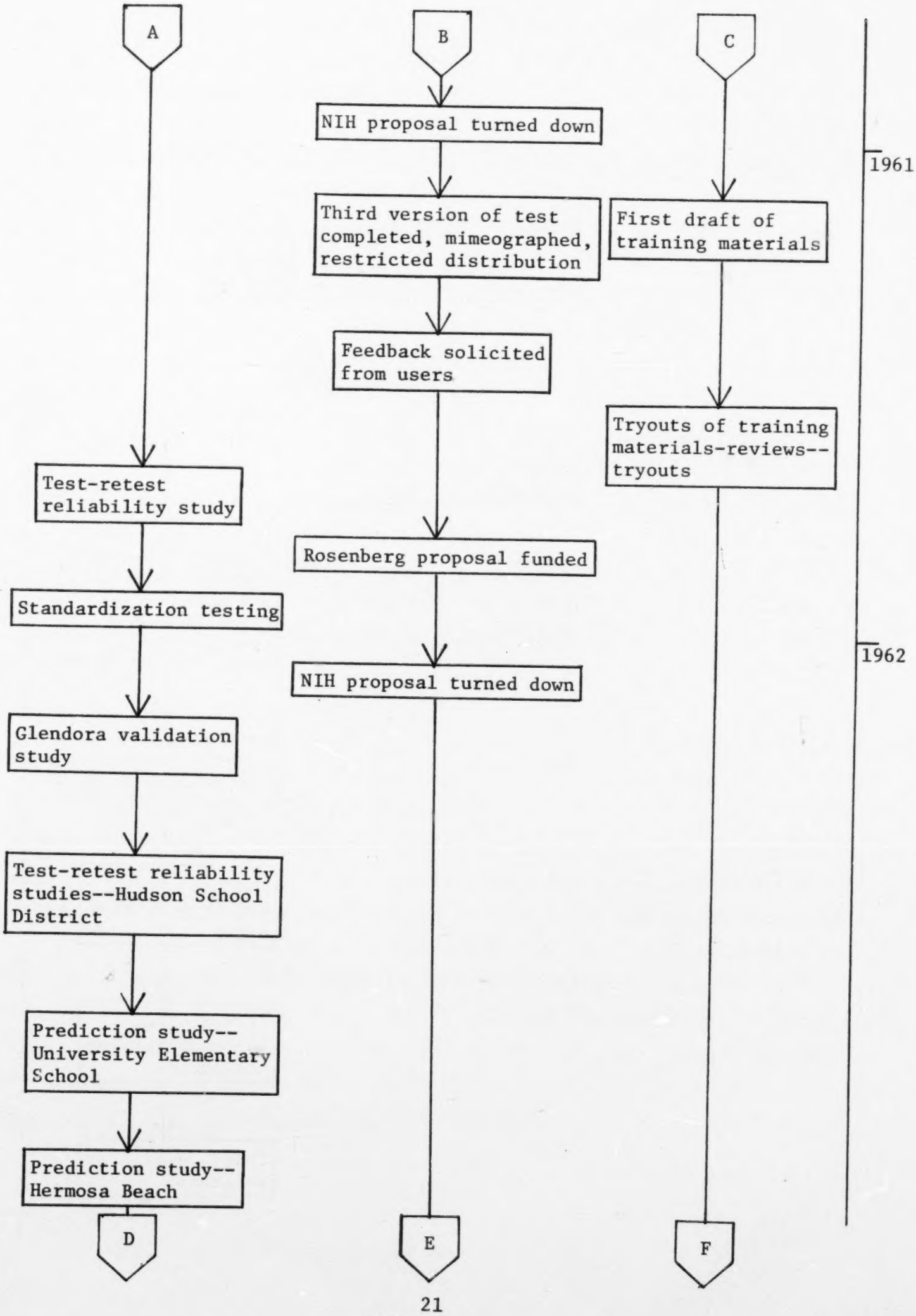
Visual perception was also chosen because she felt convinced that it is at the peak of its development between the ages of 3½ and 7½ when children face the all-important first school tasks leading to academic learning. Clinical results indicating that perception could be trained provided strong motivation for focusing attention on early identification and prevention of deficiencies before they grew into serious learning handicaps and emotional disturbances.

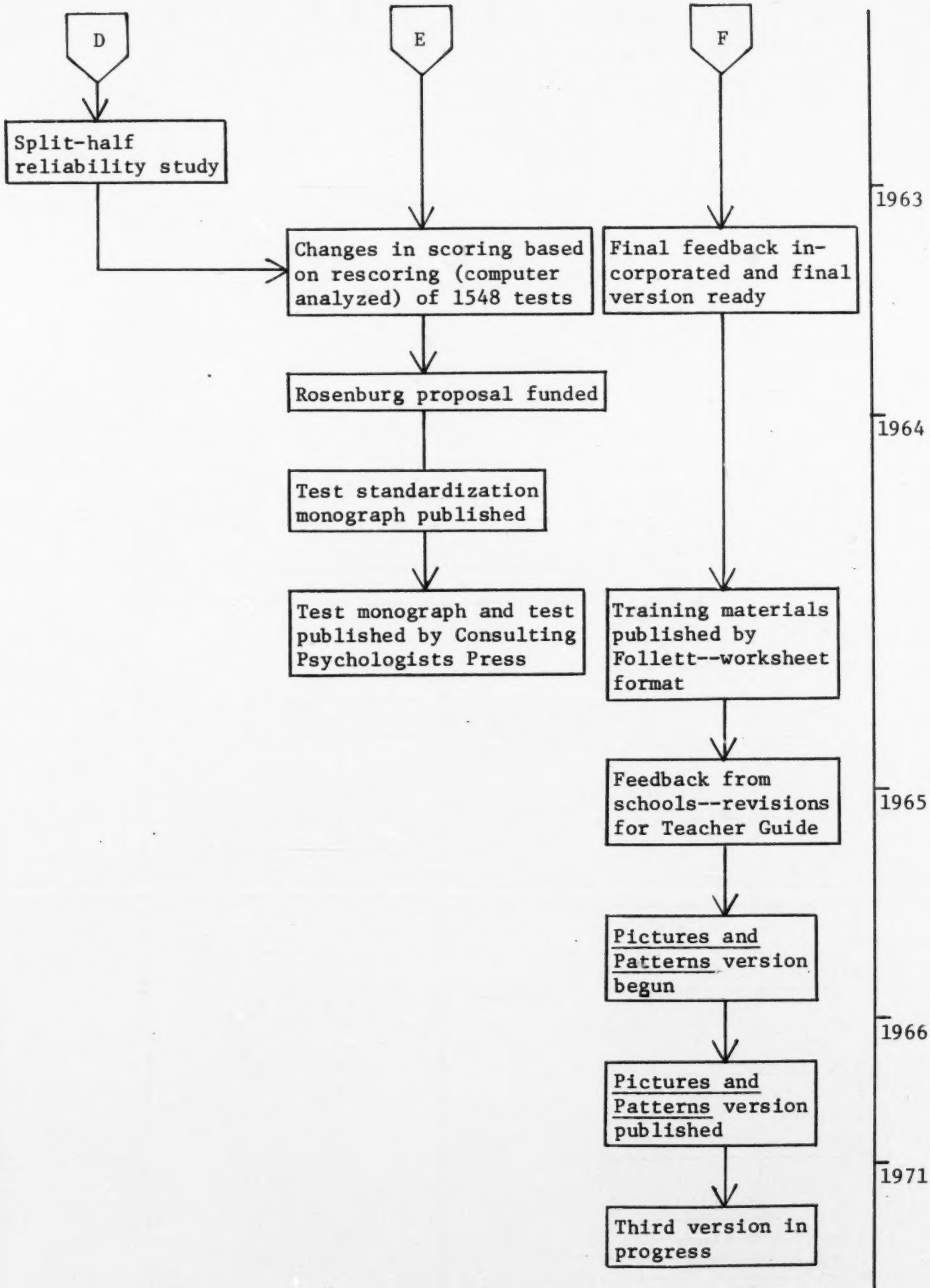
Finally, before trying to develop a new test, Dr. Frostig had made an intensive search of the relevant literature and other known tests in the hope of constructing something usable out of previous investigations. However, the main consequence of this search was the realization that no good baseline data existed on the perceptual development of the normal child. A major task in test development was therefore to establish age norms.

Figure 3

Major Event Flow Chart




A
B
C
NIH proposal turned down
Third version of test completed, mimeographed, restricted distribution
First draft of training materials
Feedback solicited from users
Tryouts of training materials-reviews--tryouts
Test-retest reliability study
Rosenberg proposal funded
Standardization testing
NIH proposal turned down
Glendora validation study
Test-retest reliability studies--Hudson School District
Prediction study--University Elementary School
Prediction study--Hermosa Beach
D
E
F
1961
1962


D
E
F
Split-half reliability study
Changes in scoring based on rescoring (computer analyzed) of 1548 tests
Final feedback incorporated and final version ready
Rosenburg proposal funded
Test standardization monograph published
Test monograph and test published by Consulting Psychologists Press
Training materials published by Follett--worksheet format
Feedback from schools--revisions for Teacher Guide
Pictures and Patterns version begun
Pictures and Patterns version published
Third version in progress
1963
1964
1965
1966
1971

FUNDING FOR PRODUCT DEVELOPMENT

Altogether, four proposals were submitted for outside funding: two to the National Institutes of Health (NIH), U.S. Department of Health, Education, and Welfare, and two to the Rosenberg Foundation:

In 1960 a research proposal was submitted to NIH. This proposal was entitled "Visual Communication in Neurological Disorders" and requested $55,600 for the one-year period May 1961 through April 1962. The three major aims were (1) establishment of test validity and age norms based on the already-accomplished first pilot study; (2) measurement of the effectiveness of the training methods related to the test; (3) exploration of the test as a screening instrument for distingushing normal from neurologically handicapped children and for discovery of the patterns of perceptual disturbance related to the latter. It was not funded.

In 1961 a proposal was submitted to the Rosenberg Foundation. This proposal, which was funded, provided $7200 for work on test revision and standardization.

In 1962 another research proposal was submitted to NIH. This proposal for "Visual Perceptual Training," in the amount of $25,800 for the period October 1962 through September 1963, was aimed at doing a second pilot study of both the test (now the 3rd version) and the training materials and further test validity and reliability studies. The four specific objectives were: (1) correlation of Frostig initial test scores with other measuring instruments and teacher ratings; (2) comparison of changes in total perceptual scores in trained and untrained children; (3) comparison of changes in other measures of academic progress and behavior in trained and untrained children; (4) comparison of changes in Frostig test profiles in trained and untrained children. It was not funded.

Another proposal was submitted to the Rosenberg Foundation in 1963. For the one-year period July 1964 through June 1965, this proposal requested $8400 for writing a textbook focusing on teacher training in assessment measures and remedial methods for children with learning disabilities. The proposal was funded. Its contribution was not so much to product development as to dissemination of the Frostig approach through a number of published papers in professional journals and other reports. These were never actually put together in testbook form.

Thus the only official grants for product development came from the Rosenberg Foundation and totaled approximately $16,000. The two major efforts

made in 1960 and 1961 to get government funding through the National Institute of Health caused the developer to decide "it was easier to do without it."

The most serious effect of the lack of major outside funding was probably the restricted sample on which the test standardization had to be based. The scope of field testing and reliability and validity measures was also significantly reduced over what had been planned. However, some of the developer's comments will illustrate the attitude that enabled all the essentials of the planned development to be carried out, albeit on a restricted scale:

"It was a matter of using opportunities. When someone has a vision, you know, he goes after it, and whatever comes in your life to help this decision will be somehow incorporated and modified toward its realization. . . If there are no resources they will be found somehow." Although Dr. Frostig says she would never again attempt such a test development effort without adequate guaranteed funds ("a traumatic experience"), she points out what she considers to have been some beneficial results of the way the work had to be done. The lack of money "kept us on our toes," and in that respect it was a positive thing. More important, it meant they were not bound by inessential restrictions in the form of arbitrary deadlines, unnecessary reports, and adherence to rigid research designs. They could take a heuristic approach, exploring and adjusting freely according to developments. "Research, after all, must show you where you have to change, not that you were right."

The developers could not give an accurate estimate of total development costs. It was stated that the official budget of the Center during this time would give a totally false picture, because what was charged to research was only the salary of the Research Coordinator and research assistants. It was also stated that the money requested in the grant proposals described above was a gross underestimate in light of the extent of the subsequent development work. Appendix A contains rough estimates made by the developers of what could have been the cost of developing the test of Visual Perception. These estimates were based on what the developers believe to be "reasonable" current salaries. They made no attempt to estimate cost of the training materials, as "they were an organic outgrowth of the Center's work."

PRODUCT DEVELOPMENT

Management and Organization

In 1958-60 when the initial development work was done, the Frostig Center was a small, informal organization with approximately 15 staff members, many of them part-time consultants. The research staff as such consisted of Dr. Frostig and two part-time research assistants. In terms of physical arrangements, "Center" was a misnomer, since at one time it was located in five different buildings at once--"here a little room, there a little room." Financial support came from individual donations, tuition and some professional training fees. The budget was described as a matter of looking ahead only as far as the next necessity for the work they were trying to do. Some space and much staff time was donated, including that of graduate students at local colleges and parents of children treated at the Center. The student population was approximately 60.

The early product development activities were described as an organic growth out of the current Center work in educational therapy, and conducted by an already existing staff team on time snatched from their main duties. The atmosphere was evidently one of enthusiasm, cooperation, and high morale, ascribed to the inspirational personality of the Director and the chance to participate in exciting new directions in educational development that promised to be of real help to children.

According to the developers, it was the idea that kept them going. Dr. Frostig herself feels that although the lack of money and facilities clearly had disadvantages, the fact that it was her own Center, which she had built from scratch and where she was responsible to no outside authority, gave a necessary flexibility in the early stages. Even after the present governing body of the Center, the Foundation of Educational Therapy for Children, was formed in 1960 by a group of private donors (largely for legal reasons of ensuring tax-exempt status for grant applications), there was no active direction from the Foundation board in Center affairs. Nor did the Foundation begin any actual fund-raising activities until well past the time of product development.

By early 1961 the Center's permanent staff consisted of six teachers, four psychologists, a speech teacher, a research assistant, a psychiatric social worker, an administrative assistant, and a small clerical staff. The consulting staff consisted of two psychiatrists, a neurologist, a speech specialist, and an occupational therapist, all of whom donated their time.

The continuing growth of the Center included increasing professional training activities, which were a tremendous source of input to the work of development in various informal ways. For example, it had important implications for the cooperation of local school districts and universities, and for feedback and interaction in the formative evaluation and diffusion stages.

Therefore, prior to 1964, when the materials were first commercially published, the Frostig Center had no publicity, no official outside funding, no formal supporting community groups or special charity auxiliaries, all of which have developed relatively recently together with the greatly expanded present Center facilities established in 1968.

There were no formal ties with other institutions in the development of the Frostig program. However, it was heavily dependent on the informal cooperation of many other organizations, notably universities, colleges, and school districts. Among these, the following were the most significant.

University of Southern California (USC)

University of California at Los Angeles (UCLA)

California State College at Los Angeles

California State College at Long Beach

California School Districts: Compton, Covina, Culver City, Enterprise, Glendora, Hermosa Beach, Hudson, Inglewood, Los Angeles City, Palos Verdes, Santa Monica

Dr. Welty Lefever of USC donated his time to the test research design and standardization, and graduate students and other individuals gave assistance in data organization.

Most of the computer work was done on the IBM 7090 computer at Western Data Processing Center, initially through Los Angeles State College and later through UCLA. Some computer assistance was received from Long Beach State. Access to the computer facilities was given to Dr. Frostig in small pieces of time through the studies of individual professors or graduate students with allied interests. John Whittlesey of UCLA oversaw the major portion of the data processing.

The role of the school districts was crucial for the pilot study of the test, for field testing of both the test and the training materials, and for the various test reliability and validity samples leading to the test standardization.

Original Development Plan

The Frostig test and training materials were developed simultaneously and commercially published for the first time in the same year (1964). However, the training materials were put together from a nucleus of numerous individual exercises developed over many years, while the test was newly conceived, designed, and brought to publication between 1958 and 1964.

In the original development plan, test design procedures were well planned, but organization, scheduling of tasks, time schedules and other development strategies were not. It was also planned that the development of the training materials was to be based on previous clinical experience and on clinical findings in connection with construction of the test.

The overall objective of the development effort was also quite clear. It was: to construct a preventive and remedial program to evaluate and train the usual perceptual abilities most relevant to school learning. More specifically:

- To identify particular subareas of visual perception that may be disturbed independently of each other; relate them to specific learning abilities; devise training methods applicable to them
- To develop age norms for normal perceptual development to facilitate each detection and/or prevention of perceptual disturbances
- To construct a group visual perceptual test to differentially screen for degrees and kinds of deviations from established age norms
- To devise a developmental visual perception training program integrated with other developmental abilities and academics

Thus the test was to be designed to pinpoint strengths and weaknesses in five independent visual perceptual areas; the training exercises were intended to supply remedial measures to improve specific perceptual abilities related to these test areas. The training materials were also conceptualized as a general "school readiness" program, integrating language, perception, and motor activities in a developmental sequence by level of difficulty.

Modifications in Original Development Plan

There were no significant modifications made in the original development plan. The objectives of development never changed. The test design was followed vigorously. The conceptualization of the training materials also changed very

little. All other procedures that could have been specified in the original development plan were left to be decided, one by one, as necessary. However, due to the significant lack of funding, the scope of the development effort was much smaller than hoped for by the developers.

Actual Procedures for Product Development

The development and formative evaluation activities involving the test of visual perception will be discussed first. Then the development and formative evaluation activities of the training materials will be described.

Development and Formative Evaluation of the Test of Visual Perception

Work on test construction began in 1958 with what Dr. Frostig described as the first of the two most critical "enabling" events (the second being the Rosenberg grants described above). The head of the department in which she was then teaching at Los Angeles State College encourage her in her ideas for the test and arranged for her to have access to the computer facilities there. Without this help she could not have begun, because there were no funds to buy computer time.

She already had the support of Dr. Lefever at USC, who did the main part of the test research design. She began to search for someone mathematically and statistically able to help with experimental design and data processing. She found John Whittlesey at UCLA, who, as she expressed it, "really fitted in--as enthusiastic as we were and not caring if we had resources or not." In all her descriptions of the organization and personnel who worked on the project, Dr. Frostig emphasized the importance of the able and enthusiastic "certain kind of people" without whom the work could never have been done. She gives special credit to the invaluable contribution of Mrs. Phyllis Maslow, who joined the group in 1961 as Coordinator of Research when the major work on test standardization began.

Test design procedures were rigorously planned, but organization, scheduling of tasks, time schedules, and other development strategies as such were not. As described earlier, the work was done on time taken away from the participants' regular work, with the exception of Mrs. Maslow who was hired specifically to work on test development.

Staff interactions were informal and decisions were made one by one as they went along in discussions and meetings back and forth. The ideas were Dr. Frostig's. Any statistical or experimental design questions were always discussed with Dr. Lefever and John Whittlesey; anything to do with actual testing was referred to Mrs. Maslow. Dr. Frostig and Mrs. Maslow both did the contracting of school people for field testing--the actual scheduling and coordination was then Mrs. Maslow's responsibility.

The work was described as "one crisis after another." The lack of money was the major problem. For example, they had constantly to train new people to do the testing and scoring, since they had no funds to hire a permanent staff to do this.

The preliminary test was designed to answer the following hypotheses (Frostig, Lefever, Welty & Whittlesey, 1961):

a. The five chosen areas (operationally defined) of visual perception are valid distinctions which can be disturbed independently of each other in varying degrees.

b. A screening device can be devised to identify school children with perceptual disabilities.

c. The perceptual development necessary for school reading takes place between the ages of 3 and 7 and seems to reach the point of greatest acceleration between the ages of 3½ and 5.

d. There are slight differences in acceleration among the measured functions during the latter period for normal children.

e. There is a significant positive correlation between perceptual development and school achievement.

The five perceptual areas identified were chosen because from clinical observation they seemed to (a) be critical for school learning; (b) affect the total organism to a greater defree than other functions; (c) develop early in life; (d) be frequently disturbed in children diagnosed as "neurologically handicapped"; (e) be suitable for group testing; (f) lend themselves to successful training. Since the test was designed to be applicable to both normal and perceptually handicapped children:

a. It had to be a group test.

b. It had to be applicable to preschool as well as early-school-age children in order to identify problems and initiate training as early as possible.

c. It had to reveal specific difficulties to enable specific remedial measures to be instituted.

The preliminary construction of the test in 1958 began with devising the simplest possible items in order to establish a baseline for use of the test with preschool children. The guidelines for item construction were: tasks to be simple and appeal to small children; tasks able to be speedily performed, using only paper and crayons; tasks to be those observed to involve some problem for children with perceptual difficulties. To avoid contamination of perceptual tasks with visual-motor skills, a distinction was made between tests of copying and tests of recognition. Subtest I requires simple motor skills; Subtests II, III, and IV involve only recognition; and Subtest V requires copying.

In a pilot test in 1959 the preliminary test was given by specifically trained test administrators to 434 normal children in the Southern California area, both preschool and public school children in grades K-2 with an age range from 3 to 8½ years old. The public school children were from four different schools chosen by administrators of the school districts to represent an adequate socioeconomic spread. Total scores were analyzed by age levels for evidence of growth, comparing alternate half-year groups by means of the Kolmogorov-Smirnov Two-Sample Test. An item analysis was also done by alternate half-year groups, using the same Two-Sample Test. Scores were the compared with test scores of 71 children at the Frostig Center with known learning disabilities (most referred as "neurologically handicapped"). The developers felt that the results of the pilot stody substantiated all five hypotheses to an extent that warranted further work on such a test instrument.

The results of the item analysis indicated individual item significances for the different age groups. They also indicated item weaknesses, which resulted in complete revision of one subtest and modifications in others. Changes in scores with increasing age showed greatest acceleration between the ages of 3½ and 5½ years, giving evidence of greatest concentration of normal perceptual development in those years. The discriminating power of the test for perceptual growth was evidenced by the fact that between the ages of 3 and 6 the median score in each year exceeded the third quartile for the previous year. Also, the total scores of the 71 children in the learning disability sample were lower than those of the normal children, indicating a maturational

lag in visual perception. Their subtest scores showed a much greater scatter. The pilot test results also indicated that the test ceiling was too low.

After revisions in items and item combinations were made, they were tried out on several groups of 100 or more students in 1959-60 to discover which were most efficient in discriminating between age levels. Frequency distributions from the 71 abnormal children were compared with those of two matching samples of about the same size. The results confirmed that both total score and scatter or range in scores deviate markedly from those of normal children. Then specific remedial training exercises were instituted over 1959-60 relative to test findings for the 71 abnormal children.

In 1960 test-retest reliability coefficients were calculated for 50 children at the Frostig Center, tested three weeks apart by the same trained psychologist. Reliability was .98 on total scores for the full range of ages and the average reliability coefficients for the subtests was .80. Also in 1960 a second version of the test was completed incorporating item revisions, including those to correct for the too low ceiling of the preliminary version. This second version was given to approximately 400 children, again in schools in the Los Angeles area. The main purpose was to eliminate item flaws. Further item analysis and revision was done on the basis of the results. At this time, scoring criteria were refined, and the concepts of perceptual age and perceptual quotient (PQ) were developed.

In October 1960 the first NIH proposal was prepared in an attempt to get funds for test reliability and validity studies on the second version over a wider sample and geographical area. The cooperation of public school systems in Northern California, Chicago, and Baltimore had been promised. However, the proposal was rejected, and no test reliability or validity studies were done on the second version.

What was eventually published as "3rd Edition" of the test was essentially completed in March 1961. The criteria used for final item selection were good age progression and low degree of contamination among the five different visual perceptual abilities. The items in the subtest on form constancy proved the most difficult to construct, having never been used in any other tests. Eight different versions of this subtest were evaluated before it was considered satisfactory.

In the Spring of 1961 the test was given two weeks apart to two groups of 35 first graders and two groups of 37 second graders in the Santa Monica

School District. The test was administered by trained psychologists. Reliability of the perceptual quotient for the entire sample was .80.

A $7200 grant from the Rosenberg Foundation enabled the main public school test standardization field testing to be done in the fall of 1961. For lack of funds, the test standardization sample was restricted to Southern California and was recognized as deficient both geographically and socioeconomically. An attempt was made to get a stratified socioeconomic sample by having school district psychologists and principals rate various districts and schools. However, exact enough information on socioeconomic status turned out to be unobtainable, and the sample from the seven public schools chosen was overwhelmingly middle class (low-middle to upper-middle class strata). The same was true for a later nursery school sample in 1962-63. The total standardization sample consisted of 2100 children between the ages of 3 and 9. The standardization testing and scoring were done entirely by personnel trained at the Frostig Center. Normative curves indicated that maximum perceptual development in the areas measured occurs between the ages of 4 and 7. The resulting units of measurement were perceptual age level scores, scale scores, and perceptual quotients. Standardization curves were calculated for the individual subtests by half-year age groups; and means, standard deviations, and upper and lower quartiles recorded.

Distribution of the test in mimeographed form from the Center was made on a restricted basis. At this time Dr. Frostig was doing a great deal of traveling, giving lectures and workshops, and through her contacts the test was tried over a large geographical area. However, it was restricted to school psychologists who knew something about the rationale behind the test and who the developers felt would be careful in administering and helpful in appraising it. The test was distributed in this way to larger and larger numbers in the period 1962-64. Feedback was solicited throughout these trials and some revisions made as a result.

The second NIH proposal was aimed at doing a pilot study on the 3rd Edition of the test and to conduct further test reliability and validity studies, including correlations with other tests and with teacher ratings. As a result of the proposal's rejection, no pilot study was done on the 3rd Edition. However, most of the rest of the proposed work was accomplished on a restricted scale, as described below.

In a test-retest reliability study in the Hudson School District, the test was given 14 days apart to three kindergarten and three first grade classes in schools in La Puente, California to determine reliability when the test was given by people trained in its administration but who were not psychologists. The results appear in the Test Standardization monograph. Several test validation studies were also conducted in Glendora, California; three first-grade classes were rated by teachers on classroom adjustment, reading level, laterality, and the vocabulary section of the WISC Test to determine correlations with Frostig test scores. The results confirmed correlations of low test scores with school failure. Good correlations were found with reading readiness tests, the vocabulary section of the WISC, and teacher ratings of behavior. No correlation was found between test scores and right- or lefthandedness, suggesting low significance of this factor related to reading achievement. At the UCLA University Elementary School, a study of a group of 25 children indicated the predictive value of the Frostig test for problems in beginning reading. Testing of 193 kindergarten children in the five schools of the Hermosa Beach School District in connection with a pilot study of the Frostig training materials provided further test validity measurements. Also, a survey was made of test scores of 53 children at the Frostig Center known to have severe learning difficulties. All the subjects had IQ scores of 76 or above and were age 9 or under. Fifty-five percent had scores falling below the 25th percentile on the test. (Together with other later surveys indications are that 75 percent of such children manifest visual perceptual difficulties and 50 percent auditory perception difficulties.)

As a result of suggestions from test tryout users, all 1548 tests from the standardization sample for children aged 5 or older were rescored for Subtests II and V and new scoring procedures were applied. The revised scores were computer analyzed. The new scoring for Subtest II improved reliability and age equivalent discrimination and was therefore adopted. That for Subtest V was not changed. An item analysis was done on the 1548 tests of children aged 5 or older and items paired for comparable difficulty within each subtest. Split-half reliability coefficients were obtained, and are presented in the Test Standardization monograph. Also reported in the monograph are the correlation coefficients obtained between the Frostig perceptual quotient and the Goodenough intelligence quotient.

The second Rosenberg Foundation grant enabled the production of numerous articles and reports related to the test, which led to more tryout requests from schools and feedback from users. The completion of the test standardization in late 1963 and its publication as a monograph by Perceptual and Motor Skills in early 1964 marked the end of the developmental and formative evaluation phases of the product.

Development and Formative Evaluation of Training Materials

The Frostig Program for the Development of Visual Perception is published in two different formats, as described under Product Description. The actual training exercises, however, are virtually identical in the two versions. It in important to note that the exercises were developed from clinical experience over several years. The development effort describe in this section refers to the modifications and development of exercises based on clinical findings in connection with construction of the Frostig Test over the same 1958-1964 period. Although aimed specifically at training in visual perceptual functions, the materials were designed to be integrated with a program for development of motor skills, language skills, and the cognitive skills and memory functions associated with early learning.

As previously discussed, the overall development effort concentrated initially on the test. It was felt that the establishment of age norms and the pinpointing of specific subareas of visual perceptual disability were essential to prescribing specific remedial measures for individual children. Therefore, the test gave a base for developing a training program. Referring to the flow chart on page 20, it will be seen that work on the training materials proceeded concurrently with the test. The evaluation of the effectiveness of the training methods was based in part on improvement as measured by the test. By 1961 the results of both clinical observation and pre- and posttests at the Frostig Center were considered to support the theory that visual perception could indeed be trained and that it was significantly related to academic and behavioral improvement.

It was at that time that the various training exercises and materials used during the previous three years were collected and correlated with the five subareas of the test. The exercises were further subdivided in the form of worksheets according to specific tasks and then arranged at successive levels of difficulty within each area, determined by clinical experience.

Preliminary versions of a teacher's guide and worksheet instructions were prepared. These materials were then used intensively at the Center during the next two years, and were distributed to approximately 40 Los Angeles area school districts for experimental use. Revisions were made based on feedback from both sources.

A pilot training study was carried out in kindergarten classes in the Hermosa Beach School District in early 1962 with children with perceptual difficulties. During the summer and fall of that year the materials were field tested on normal children in several K-2 classes in Los Angeles County to test the arrangement by level of difficulty.

A final version of the materials was considered complete by 1963; in the meantime efforts had been made to interest publishers, without success. When Follett published them in 1964, they did so in separate worksheets grouped according to the test areas; this is the format now referred to as the "remediation program." Two years later the materials were published according to developmental sequence in the Pictures and Patterns workbook format.

Further discussion on the format decisions will be given in the Dissemination section of this report. However, the trend of Dr. Frostig's own thinking on method of presentation as the materials were developed will be discussed here.

It seems probable that the developer's clinical orientation--that is her primary concern and emphasis on helping individual children with learning disabilities--and her personal giftedness and artistry in teaching were almost handicaps when it came to some of the problems of putting together the training materials in generalized form. She seems to have been trying to develop them to solve what has been called by psychologist J. McV Hunt the "problem of the match," by relating them as closely as possible to specific remedial measures based on the Frostig test, but also to integrate in them other developmental functions. The "problem of the match" has been generally stated in the following way: "the learning task must engage the child's already formed conceptions and at the same time call for samll increments or modifications of them" (Frostig and Maslow, 1969, p. 23). The Frostig training materials were developed in the attempt to relate individual perceptual abilities to different perceptual tasks at different stages of development and performance; and at the same time to integrate perception with other developmental functions.

A second major concern of the developer was to write a Teacher's Guide that would encourage teacher creativity while still insuring proper use of the materials. The program was designed to be used as much as possible by regular teachers in regular classrooms. "What you do in Special Education is good teaching." David Horne, a child therapist at the Frostig Center, was the chief collaborator with Dr. Frostig on the materials development and apparently wrote most of the teacher's guides. The challenge was to translate the ideas and teaching methods evolved out of clinical experience in a way that would be readily understood and used correctly by large numbers of teachers.

At first, the development of the training materials seems to have been more specifically oriented in terms of the five subareas of visual perception coming out of the test development. But according to Dr. Frostig she came more and more to believe that the best presentation of the training exercises would be in terms of a developmental sequence which would incorporate the different perceptual abilities at each stage and integrate the whole area of perception with other developmental areas. (The test would analyze, but the training materials should synthesize.) This was really a broadening of the target which evolved out of her own thinking about the use of the materials for maximum effectiveness. Her concurrent and later to be intensified interest in movement education contributed to the incorporation of the sensory-motor aspects into the training materials.

In 1961 when the materials were first put together for preliminary experimental use they were cross-referenced two ways: (1) by level of difficulty incorporating the five visual perceptual areas; and (2) by the five separate areas with a level of difficulty sequence within each.

As the testing of the materials went on, clinical and classroom experience led Dr. Frostig to submit the materials for publication arranged according to their levels of difficulty, each level incorporating all five visual perceptual areas. Related to this decision was the discovery that teachers tended to use the materials in an oversimplified way. After initial publication (the second way--in ditto format geared to the five perceptual areas), this result became even more manifest. Schools would order the Program Box, with one Teacher's Guide, and the worksheet materials would be given out to several teachers, who often did not read the instructions in the guide. "To march mechanically through the worksheets is nonsensical." When the

Pictures and Patterns version came out two years later by level of difficulty across the five areas (which is the way the developer had wanted it the first time), the Teacher's Guide was extensively revised to give more detailed instructions, as well as more suggestions for incorporating other than visual perception training into the program. A third revision of the Teacher's Guide is currently in process, again giving even more detailed instructions, felt to be necessary based on feedback from users. The third version will also broaden the emphasis still further from the initial focus on visual perception, not only to integrate more auditory perception, language, and cognitive abilities, but also to stress the child's integrative and memory functions.

In 1962, 193 children in the kindergarten classes of the five schools in the Hermosa Beach (California) School District were tested with the Frostig test. Of the 46 who scored 90 or below, 16 were from one school, which was then chosen for a pilot training project using the training materials. (A child who receives a score of 90 or below--in the lowest quartile--is very likely to experience difficulty in beginning to learn to read.) The children in two kindergarten classes were ranked according to Frostig test scores, marked off in pairs, and one from each pair chosen for training by flipping a coin. Test scores for the 20 children to be trained ranged from 62 to 124, with 8 children below 90. The range for 22 control students was 50 to 128, six with scores below 90 and two scoring at 90. An experienced teacher from the Frostig Center conducted training in two groups of 10 children each over a six-week period in the spring, using the workbook exercises and the associated games, 3-dimensional activities, and body movement exercises. There were 18 training sessions in all of 85 minutes each, including recess and snack time. The control group remained with the regular school curriculum, which included some conceptual exercises, under the direction of their regular teacher. When retested, both groups gained, but the trained group "gained significantly more. Using a median gain of 15 points as a cut-off, a two-by-two table produced a chi-square value of 9.9 ($p = .005$)." All children in the trained group scored 90 or above (one at 90); four children in the control group fell below 90.

During 1962, the draft version of the worksheets and teacher's guide was sent to 40 different Los Angeles County schools for experimental use in kindergarten, first, and second grades. The materials were revised again on the basis of feedback from these tryouts. In the meantime, of course, they

were continually being used at the Frostig Center and modifications made based on that also.

By 1963 the discussions began with Follett regarding publication. Although no effort had been made to contact publishers about the test ("we never felt it was really ready"), there had been a few sporadic efforts to interest publishers in the training materials. This was not systematic--Dr. Frostig herself feels they were "naive" about it. The answer from publishers was always that they saw absolutely no market for the program. (As was pointed out by the developers, in the early 1960's publishers were very much more textbook-oriented compared to the burgeoning of supplementary type materials in the last half of the decade.)

Both the test and the training program were published in 1964, largely through the coordinating efforts of Dr. Murray Tondow, to be discussed in the next section. However, a great deal of interest in educational circles was being generated throughout the 1962-64 period by the controlled dissemination of the preliminary materials through the Frostig Center; and, most important, through a large number of workshops conducted by Dr. Frostig and others from the Center by invitation from interested schools and other groups.

SUMMATIVE EVALUATION

The developers have explained that the results of studies evaluating the effectiveness of the visual perceptual training program "are pretty much directly correlated with the degree of integration of visual perceptual training with training in other psychological functions and with academic skills." Therefore, the developers believe that the training program "should be evaluated by an individual/treatment interaction approach, using multiple criteria."

Numerous small studies have examined the effectiveness of the program (For examples: Allen et al, 1966; Arciszewski, 1968; Beck & Talkington, 1970; Bennett, 1968; Beyer, 1965; Cohen, 1966; Cowles, 1969; Cupertino Union School District, 1966; Davey, 1967; Dreier, 1966; Forgnone, 1966; Fullwood, 1968; Hall & Deacon, 1970; Jacobs, 1968; Kannegieter, 1970; Lansdown, 1970; Ritz, 1969; Walsh, 1971). Studies using the program with educable and trainable mentally retarded, physically handicapped, deaf and disadvantaged children have generally reported positive results. The results of studies

working with some economically disadvantaged black children have generally been especially good. The results from studies using the program with "normal" children have been variable.

Just as many small studies have examined the reliability and validity of the Frostig Test of Visual Perception (For examples: Allen, 1969; Anderson, 1965; Boyd & Randle, 1970; Culbertson & Gunn, 1966; Ferguson, 1967; Gezley et al, 1966; Hill, 1968; Hueftle, 1967; Jones, 1965; Olson, 1966; Todd, 1968). The results of these studies are generally supportive of those reported in the Mental Measurement Yearbook.

DIFFUSION

Agency Participation

Two publishers and the Frostig Center were involved in the diffusion of the Frostig test and training program. Consulting Psychologists Press published the test, and also disseminated the training materials under a reciprocal arrangement with Follett Educational Corporation, which published the training program and also disseminated the test. In the prepublication years 1962-64 both the test and the training materials were distributed in mimeographed form from the Frostig Center on a semi-controlled basis.

Diffusion Strategy

It seems to be generally agreed that the biggest "seller" of the program was Dr. Frostig herself, whose many workshops, lectures, writings, and personal dedication to the concepts created immediate and widespread interest in educational circles. In the prepublication year 1963, for example, approximately 18,000 copies of the test were sent out from the Frostig Center in response to requests.

It is not entirely clear why the test and training materials were eventually published by two different publishers. According to Mr. R.J.R. Follett, president of Follett Educational Corporation, they would have published the test also had they had the opportunity. Apparently it was both a matter of timing and the fact that Follett was not experienced in test publishing, while the small Consulting Psychologists Press was a totally specialized test publisher.

What is clear is that the program "took off" immediately, and that the impetus came from educational circles, primarily from teachers. Follett would release no information on the number of copies sold, but did confirm its immediate success, which he attributed to both timing and "cachet" (apparently meaning distinctiveness and prestige-related popularity factors). He felt the school market was simply psychologically read for it, but had he tried publishing it two years earlier that nothing much would have come of it. "I claim no genius on it--it was just luck." Dr. John Black of Consulting Psychologists Press confirmed that it caught on fast--the old saying about an "idea whose time had come." It fit in with a developing movement in early childhood education, where people were hunting for good materials. He felt it spread largely by word of mouth, enormously abetted by Dr. Frostig's "virtuoso performances" in workshops and other personal interactions with school people. (This last was echoed by others formally interviewed for this report and by teachers in informal conversation.) Apparently, her demonstrations of the test and what she could conclude from it were startingly effective, and it was difficult for the participants to come away thinking anything but "that's a great thing and I've got to have it," regardless of their own capacities to use it as effectively.

Dr. Murray Tondow, whose self-described role was that of a "catalyst" in getting both the test and the training program published, also expressed the opinion that the program spread mostly "from below." It was not usually a school district adopting it or a principal or curriculum person imposing it, but a teacher wanting it. The teachers saw the problems every day and were hungry for good methods to help solve them. Again, he stressed the effect of the Frostig workshops. He found it particularly fascinating, he said, to attend a general summer conference where some articulate professors would expound on theoretical considerations of limited impact or meaning for teachers, comparing and criticizing different curriculum approaches. Then "Marianne Frostig would get up and bring the teachers to life"; they listened about specific things they could do in their classrooms and went away filled with enthusiasm.

It should be noted that in 1965, with the passage of the Elementary and Secondary Education Act which supported with Federal funds innovations to bring educational opportunities to "educationally deprived" children, many more special classes were established for the educationally handicapped. In

some states they became mandatory. Teachers with little or no formal training found themselves assigned to such classes, and the ostensible simplicity and comprehensibility of the Frostig program made it extremely attractive.

In the summer of 1965, over half a million children attended Head Start programs in 13,000 centers that opened up on a few months' notice (Pines, 1966). While Consulting Psychologists Press received few large orders for the test from whole school districts (as, for example, with achievement tests), it did receive some large summer orders from Head Start programs which were specifying use of the Frostig test for all children because of its specialized nature.

Actual Diffusion Efforts

Developer

As indicated previously, the developer began distributing the test and materials on a controlled basis by 1962. By "controlled" is meant that the test was distributed only to licensed psychologists or to teachers known to have been trained. This is still the way the test is supposed to be sold.

An important factor in diffusion, the developers felt, was published papers and invited lectures through professional organizations, such as the American Psychological Association, Association for Children with Learning Disabilities, the American Orthopsychiatric Association, and so on. Some of the publications and papers presented at conferences were made possible by the 1964 Rosenberg Foundation grant described earlier, originally intended for a textbook on teacher training for work with children with learning disabilities. Dr. Frostig and her associates have published many articles, and she herself is in such demand for speeches and workshops that she cannot accept many of them. (There was some frustration expressed in conversations with the Center staff about how many requests there are for consultations, workshops, and information of all kinds from people who have received government money for projects using the Frostig materials; and yet the Center has been unsuccessful in getting such funds to be able to expand those services.)

The Frostig Center has no formal consulting service, although one staff member has to be assigned to answer the volume of routine inquiries that come in from all over the world. Dr. Frostig herself, or her close associate, Mrs. Maslow, answer the inquiries requiring professional judgment or policy answers.

Dr. Frostig professes to have had little to do with the actual publication negotiations or details. She was put in touch with both Follett and Dr. John Black, head of Consulting Psychologists Press, through Dr. Murray Tondow, a colleague from her days at USC. It is evident that his was the most significant role in getting the materials published.

Dr. Murray Tondow received his doctorate in psychology at the University of Southern California in 1953 at the same time Dr. Frostig was in the graduate program there. He is now President of Behavioral Sciences, Inc., Palo Alto, which develops and markets "mental health delivery systems," and is a partner in a publishing company developing curriculum materials and services utilizing computer technology.

At the time he first knew Dr. Frostig, one of Dr. Tondow's main interests was statistics and the use of computers, so he became peripherally involved in the exchange of ideas on the analysis of the Frostig test data during development. But he became more and more interested in the training materials. In 1961, when the test was reaching the final development stage he was working for Science Research Associates in Chicago, whom he tried to interest in publishing the test. SRA, although a large and well-known publisher in the field of tests and guidance, was not interested--they saw no market for it.

At the same time, the first rough compilation of the training materials had been done, and discussions began between him and Dr. Frostig on what format and approach to publication might be the best. He began to think about it and to make inquiries.

Dr. Tondow expressed the trend of his own thinking as related to the main problem of this stage of development of any innovative program--how to separate the originator from the product itself. It was a question of arriving at a format that could be widely disseminated and operate independently of the originator--"how much was Marianne and how much was the materials?" He describes the ensuing discussions as centering around trying to reconcile the intentions of Dr. Frostig, "an extraordinarily gifted teacher with very high standards for the presentation of her unique and original methods" and his own efforts to come up with a workable format that would stand alone.

After 1961 Dr. Tondow had left SRA to become dean of research and development at a Chicago experimental college and had written a textbook to be published by Follett. Through these contacts with Follett, he tried to interest them in the Frostig program, both test and training materials. His

initial efforts bogged down in many points of conflict, although Follett was apparently at that time deciding to move toward the early childhood education field, which they had not been in before. Dr. Tondow observed that all the publishers seemed to see the Frostig program as too specialized, while he and Dr. Frostig both saw it as applicable to the optimum development of all children at a certain maturational phase. In addition, Follett was inexperienced in the testing field.

At this point the efforts toward publication of the test and the training materials diverged. Dr. Tondow became acquainted through the college in Chicago with a wealthy, long-time independent entrepreneur in the financing and promotion of promising educational ventures and their subsequent sale to publishers under royalty arrangements. He became interested and committed enough to the Frostig training materials to underwrite some of the format decision work and said, in effect, "we'll get it published." According to Dr. Tondow, this man was in a position to print the materials himself if necessary, and this very fact sharpened Follett Corporation's interest. The end result was that Follett took on the Frostig training materials. (The Follett publications then and since have credited as collaborators Curriculum Materials Laboratory, Inc., the organizational entity set up in these negotiations.)

In the meantime, Dr. Tondow had approached people he knew at Consulting Psychologists Press in Palo Alto about publishing the test. His role in the publication of the test was confined to this initial contact, but he continued to be involved in the training materials, including more work on the second Pictures and Patterns version than on the first version, due to the whole new cross-referencing that had to be done to pinpoint criterion measurement points and include many more teacher options. During this period, sometimes Dr. Frostig "drove me up the wall, but right or wrong she always had her eye on the integrity of the materials. . . and time has proved her correct on most of her positions."

Follett Educational Corporation

Dr. Tondow believes that R.J.R. Follett, now president of Follett Eductional Corporation, deserves a great deal of credit for taking a gamble on the Frostig materials, and that one of the reasons for the original spirit master format was to minimize costs in this gamble. The nature of the materials required some way for a child to be able to practice on and do the same exercise as many times as necessary, and the spirit master format was the most practical answer.

The change two years later to a workbook format with acetate overlays was initiated by Follett. Dr. Tondow tells an anecdote about the kind of thing that led to this decision: A frantic call came to the publisher's office from a school supervisor in New York City. They had bought several kits and run off 300 copies of 90 masters from each kit; all this paper ended up in her office and the reaction was, "What am I going to do with it?" It was an enormous collation problem--cheaper in price but not in time.

Mr. Follett says that Murray Tondow, who was a personal friend in whom he had confidence, sold him on trying the Frostig program. It was also "a seed that fell on fertile ground," since they were moving toward interest in the field of early childhood education. They were not interested, however, in getting into Special Education as such--that market wasn't big enough nor did it fit into their particular emphases. The initial publication in the spirit master format was related to customer needs as they saw it. It seemed the only way they could manage to put out over 350 separate exercises to be used with wide latitude--doing the same exercise over and over, if necessary. Customer response dictated the change to the workbook format two years later. They asked for something "more manageable," and the publisher has found that the customers much prefer the workbook format for classroom management, despite the fact that the spirit master format might be better for children than the plastic overlays. Follett apparently used their usual dissemination channels except for possibly including a few special groups in their mailing lists--for example, the Council for Exceptional Children. They used their ordinary advertising approaches. Again, they were not interested in promoting the Special Education side of their business--their target audience was the broad early education field. Follett has always maintained a consultant capability to help teachers and administrators with installation and use of their educational products, and they did expand this somewhat in relation to customer response to the Frostig materials.

The biggest selling point, in Mr. Follett's opinion, has already been described--time and "cachet." Ideas become popular, "like ecology now." Asked about competitive products, he said there is no competition as such for the Frostig program. Unlike the reading market place or basal texts, it does not compete for the same dollar but for priorities of time and money in terms of acceptance of the value of the idea. That is, is the value of visual perceptual training important enough to justify replacing or denying

something else in the limited hours of the school day? He believes this is true of any innovative product.

Consulting Psychologists Press

Consulting Psychologists Press (CPP), according to its founder, Dr. John Black, was formed about 15 years ago because a colleague of his had devised a test that deserved to be published but that had run into competition with big publishers. Dr. Black is a clinical psychologist, with a background in psychological testing, whose present position is Coordinator of Research, Office of the Dean of Students at Stanford University, California. CPP was helped in its early stages to become a small but viable test publishing company by taking over the distribution of tests published by Stanford University Press. They gradually published other tests, almost entirely secondary school, college, or adult oriented. The company was still small at the time it contracted to publish the Frostig test (one full time employee and perhaps six part time employees, mostly clerical people). CPP has from the beginning to the present contracted for printing, artwork, and advertising.

Dr. Black was contacted by Dr. Murray Tondow through one of their original incorporators and board members. CPP had no background in early childhood tests, let alone Special Education, and Dr. Black was not excited about the idea. For one thing, it was a complicated production job involving demonstration cards and scoring templates as well as the test booklets and administration manuals. He "procrastinated," not thinking much about it for a number of months, and only when he first met Dr. Frostig did he decide to go ahead. "She was so compelling and charming," that he was persuaded to start to work on it. He did not look at it as a money-maker, but doing a small first printing was their usual procedure and it seemed worthwhile to try to break even.

Not much redesigning was involved on the test itself. It was pretty much a production task, although considerable work was involved in finding paper lightweight and cheap enough but still opaque so that the figures would not show through and adaptable to use of crayons. They edited and producted the administrative test scoring manual and bought reprint rights for the test monograph from the journal, Perceptual and Motor Skills. (Actually, at first, they simply bought and distributed the test monograph.)

The promotional effort has remained the same since the start and focuses on some advertising in professional journals, dissemination via the regular

catalog, and prominent displays every year at about six professional conventions (e.g., the American Psychological Association). This is CPP's normal procedure; their advertising has never been large in relation to sales volume. Commercial promotion of the Frostig test has really been done by Follett's sales representatives along with their promotion of the training materials. The agreement with Follett was simply a matter of how to coordinate two closely related items published by two different organizations for the convenience of the user--neither makes money on the reciprocal discount arrangement.

CPP has no provision for consulting. They would have been willing to set up workshops for Dr. Frostig, but she already had many more than she could handle. They helped in the production of a film on administration of the test.

Dr. Black's concurrence with the matter of timing and Dr. Frostig's own major contribution to the dissemination of the test has already been discussed. He feels a major factor in the success of the test was that it was a straightforward, practical solution to the problems faced by teachers. Unlike some more complicated materials restricted to psychologists, Special Education teachers in a district with only one psychologist or reading consultant could go ahead on their own to try to alleviate pressing problems. The orders have come in mainly from individual Special Education teachers or from relatively small programs, but the cumulative effect has been large and worldwide.

Product Characteristics and Other Factors Affecting Diffusion

The product is very compatible with other school practices. While the test and the training materials provide an integrated package, they can be used separately. Teacher training is required and can be obtained at the Frostig Center. Start up and continuation costs are modest and should not restrict use of the program.

ADOPTION

Extent of Product Use

Consulting Psychologists Press has apparently kept no systematic record of volume of orders for the Frostig test. But piecing together figures from year-by-year printing orders gives the following rough approximation of the pattern of sales of test booklets alone: Starting with 40,000 copies in the year of publication (1964), volume doubled in each of the next two years. In 1967 it reached approximately 375,000, and in 1969 and 1970 had doubled

again to between 700,000 and 750,000 copies. In 1969 CPP contracted out part of the Frostig production to a Midwest printer to supply the Follett orders. Geographically, the test spread heavily in the West at first. Now it sells all over the country and in foreign countries. They were really "kept jumping" at first to keep the test in stock, because previously even 10,000 copies was a big print order for most of their tests.

No record could be obtained from Follett of volume of orders for the training program. A rough estimate of the number of students involved in the training program would be about 200,000. Again, as with the test, the training program is used all over the United States and in some foreign countries.

Installation Procedures

No unusual physical arrangements, equipment or classroom organization is required. The developers have recommended that any user give priority to teacher training. The developer pointed out that the critical factor in introducing any new material is the effectiveness of teacher education. Unless a teacher is thoroughly acquainted with normal child development and with techniques of behavioral observation subsumed within a viable theoretical framework, she is confined to being either a technician or a baby sitter. While the product should not be modified by the user, it is designed to emphasize individual differences in students. Administrative support, extra staff requirements, and public relations are not unusually critical.

The developers have recommended the following steps in introducing the training program for developmental or readiness purposes in a school:

1. Viewing of a film showing the handicaps suffered by children with visual perceptual disabilities.

2. Reading of the revised Teacher's Guide to Pictures and Patterns, followed by small group discussion sections.

3. Demonstration by an experienced teacher working with a group of children with and without known visual perceptual problems, followed by a question and answer period. The primary goal would be to help teachers observe visual perceptual difficulties in their own classroom, without assistance of standardized tests.

4. Viewing films or videotapes showing how the material should be used in an integrated fashion.

5. Role playing sessions by teachers teaching each other. Classroom demonstration, if possible.

6. Classroom introduction.

7. Seminars held four and eight weeks after classroom introduction.

8. Resource teacher available to each classroom for at least one hour during the first eight weeks to answer questions and to check on any child who may be having special difficulties. Such children should be referred for a developmental evaluation.

9. Workshops to be held as soon as possible which focus on (a) sensory-motor abilities; (b) language; (c) integration of psychological functions; (d) teaching of beginning math; (e) teaching of beginning reading. The focus should be on the topic indicated, but visual perceptual training should be discussed as it bears on the central topic.

10. A workshop in which teachers share three-dimensional training materials they have made or found.

11. Resource teacher constantly available; selected papers and all relevant research reports available; special workshops for new teachers in the district; evaluation sessions/reports at least once a year.

The first five items could be combined into a Friday night-Saturday workshop if the reading were done in advance.

The resource teachers or leaders should have been trained by universities, by other districts, or by the Frostig Center.

It was recommended that money for installation procedures be channeled first and foremost into production of films and video-tapes, particularly those which use groups of children or an entire classroom.

FUTURE OF THE PRODUCT

The recently published MOVE-GROW-LEARN program focuses on movement education. In this program all other abilities (including visual perception) are considered from the point of view of how movement education may enhance a specific ability or help integration of abilities.

This movement education program is designed to meet the special needs of preschool and primary level children in the development of specific movement skills and creative movement. There are three main components:

1. Movement Education: Theory and Practice, Marianne Frostig and Phyllis Maslow. Chicago: Follette Educational Corp., 1970.

2. A 64-page Teacher's Guide with practical guidelines and recommendations for adapting the program to avilable time, space, and equipment.

3. A boxed set of 181 specific activities printed on 6" x 4" cards color-coded into seven main types of movement skills (attributes): body awareness, coordination, agility, strength, flexibility, balance, and creative movement.

The program is designed for use by regular classroom teachers but is also used by physical education specialists at the primary level. It is unique in its emphasis on integrating movement education in the total school program, including the teaching of academic skills.

The stated objectives go beyond those of a traditional physical education program in stressing the development of self-awareness, sensory-motor skills, and creative movement, as well as movement skills in themselves. In addition, it is aimed at promoting learning in general by enhancing such global characteristics as speed of response, focusing attention, and self-control. The objectives include:

- To promote good health and a sense of well-being, in turn enhancing emotional health.

- To teach movement skills (attributes) as defined by factor analytic studies of movement. These fall into seven broad skill categories: coordination/rhythm; flexibility; speech; agility; strength; balance; endurance.

- To give adequate recognition to the sensory side of sensory-motor tasks by including auditory, visual, tactile, and kinesthetic stimuli in movement training. For example, following oral directions (auditory), copying a movement (visual).

This MOVE-GROW-LEARN Program, along with the Perceptual-Motor Program discussed in this report, emphasizes that the Frostig materials have been, are now, and will continue to be concerned with the total child and all of his developmental skills.

CRITICAL DECISIONS

The following events are a good approximation of crucial decisions made in the developmental history of the Frostig Program for Perceptual-Motor Development. For each decision point, the following types of information were described: the decision that had to be made, the alternatives available, the alternative chosen, the forces leading up to choosing a particular alternative, and the consequences resulting from choosing an alternative.

Although an attempt has been made to present the critical decisions or turning points in chronological order, it must be clearly pointed out that

these decisions were not usually made at one point in time, nor did they necessarily lead to the next decision presented in the sequence. Many of the critical decisions led to consequences that affected all subsequent decision making processes in some important way.

Decision 1: To Focus Initially on Visual Perception

Dr. Frostig could have focused initially on one of the other perceptual-motor areas (e.g., auditory, tactile, or kinesthetic, but she chose visual perception because: (1) among the various perceptual disturbances, there was a very high evidence of visual perceptual disturbances in learning failure; and (2) visual perception is at the peak of its development when children face the all-important first school tasks leading to academic learning. The decision led naturally to the construction of a preventative and remedial program to evaluate and train the visual-perceptual abilities most relevant to school learning.

Decision 2: To Develop a Test of Visual Perception

Dr. Frostig's clinical experience, research, and theoretical ideas during the 1950's culminated in a strongly felt need for an adequate test instrument in the field of visual perception. Once the decision was made to focus initially on visual perception, Frostig decided to develop a test that would detect perceptual problems before they were manifested in learning problems and that would pinpoint specific difficulties that needed remediation. The establishment of age norms and the pinpointing of specific subareas of perceptual disability provided a basis for the development of training materials.

Decision 3: To Develop a Training Program for Remediation and Training

During Dr. Frostig's many years of clinical experience she had developed many exercises designed to remediate and to prevent perceptual disability. Once the test for visual perception was designed, she had a base for developing a training program by modifying these previously developed exercises. Although aimed at training in visual perceptual functions, the training program, as noted earlier in this report, was designed to facilitate and to be integrated with a program for the development of motor skills, language skills, and the cognitive skills and memory functions associated with early learning.

Decision 4: To Develop a Program That Could Be Used By Classroom Teachers

Perhaps the most critical decision was to design the program, which included both testing and training, in such a way that well-trained classroom teachers could use it. This increased the probability of students being reached by the program. It also helped to assure that the program would integrate language, perceptual, and motor activities in the classroom when implemented.

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APPENDIX A

ESTIMATES OF DEVELOPMENT COSTS OF TEST OF VISUAL PERCEPTION

A. Preliminary construction of test (1958)

Research Director, Ph.D. level (1/4 time)	$ 6,000.00
Artist	500.00
Printing, general clerical	1,000.00
Test administration	
Psychologist ($12.00 hour)	2,000.00
Proctor ($ 2.50 /hr.)	500.00
Test analysis	
Scoring and recording ($ 2.50 /hr.)	500.00
Statistical consultant ($15.00 /hr.)	1,000.00
Computer time	250.00
	$11,750.00

B. Pilot study and continuation (1959-1960)

	Annually
Research Director (1/4 time)	$ 6,000.00
Printing, general clerical	2,000.00
Psychologist, test administration ($12.00 /hr.)	3,000.00
Proctoring, scoring, recording ($2.50 /hr.)	20,000.00
Statistical consultant ($15.00 /hr.)	4,000.00
Report writing and publication	1,000.00
Research design consultant ($50.00 half day)	2,000.00
Computer time	500.00
Travel	1,500.00
1959	= $40,000.00
1960	= $40,000.00

C. Test Standardization (1961-62 academic year)

Research Director (1/4 time)	$ 6,000.00
Research design consultant	2,000.00
Research coordinator	12,000.00
Printing, phone, general clerical	5,000.00
Statistical consultant	8,000.00
Psychometrists (5, 1/2 time)	30,000.00
Proctors (5, 1/2 time)	15,000.00
Scoring and recording (5, full time)	25,000.00
Computer time	1,000.00
Travel	2,500.00
	$106,500.00

D. Item analysis, validation studies, additional nursery school sample (1962-63 academic year)

Research Director (1/4 time)	6,000.00
Research design consultant	2,000.00
Research coordinator	12,000.00
Psychometrists ($12.00 /hr.)	1,000.00
Proctors ($2.50 /hr.)	250.00
Scoring, rescoring, recording (5, full time)	25,000.00
Computer time	1,000.00
Statistical consultant	8,000.00
Printing, phone, general clerical	5,000.00
Travel	2,500.00
Publication	2,500.00
	$ 65,250.00

Total: $263,500.00

APPENDIX B

LIST OF PRODUCTS AND DEVELOPERS

The following is a list of products for which Product Development Reports will be prepared.

Arithmetic Proficiency Training Program (APTP)
Developer: Science Research Associates

CLG Drug Education Program
Developer: Creative Learning Group
Cambridge, Massachusetts

Cluster Concept Program
Developer: Dr. Donald Maley and Dr. Walter Mietus
University of Maryland

Developmental Economic Education Program (DEEP)
Developer: Joint Council on Economic Education

DISTAR
Developer: Siegfried Engelmann & Associates

Facilitating Inquiry in the Classroom
Developer: Northwest Regional Educational
Laboratory

First Year Communication Skills Program
Developer: Southwest Regional Laboratory for
Educational Research & Development

Frostig Perceptual-Motor Skills Development Program
Developer: Dr. Marianne Frostig

Hawaii English Program
Developer: Hawaii State Department of Education
and the University of Hawaii

Holt Social Studies Curriculum
Developer: Dr. Edwin Fenton
Carnegie Education Center
Carnegie-Mellon University

Individually Prescribed Instruction--Math
Developer: Learning Research and Development Center,
University of Pittsburgh

Intermediate Science Curriculum Study
Developer: Florida State University
Dr. Ernest Burkman

MATCH--Materials and Activities for Teachers and Children
Developer: The Children's Museum
Boston, Massachusetts

Project PLAN
Developer: Dr. John C. Flanagan and the
American Institutes for Research

Science: A Process Approach
Developer: American Association for the Advancement
of Science, Commission on Science Education

Science Curriculum Improvement Study
Developer: Dr. Robert Karplus, Director
University of California, Berkeley

Sesame Street
Developer: Children's Television Workshop

Sullivan Reading Program
Developer: Dr. M. L. Sullivan

Taba Social Studies Curriculum
Developer: San Francisco State College

Talking Typewriter
Developer: Omar K. Moore and Responsive
Environments Corporation

Variable Modular Scheduling
Developer: Stanford University and
Educational Coordinates